

What is claimed is:

1. A process for identifying and enriching cell-specific target structures, in particular for the identification of cell-specific protein combination patterns on the surface of cells and for enriching such cells, wherein said process comprises the following steps:
 - (a) depositing a heterogeneous cell mixture on one or plural surfaces with predefined structures, causing cells with corresponding target structures to become bound to such surface(s);
 - (b) removing any non-binding cells of said cell mixture from said surface(s);
 - (c) identifying the cell-specific target structures responsible for the binding of the cells to said surface(s);
 - (d) selecting and enriching cells with identical cell-specific target structures on said surface(s); and
 - (e) biochemically characterizing the target structures selected in procedural step (d).
- 25 2. The process as claimed in claim 1 wherein said heterogeneous cell mixture has been isolated from human or animal tissue or human or animal body fluids, or it consists of cultivated cells.
- 30 3. The process as claimed in one of the preceding claims wherein said surface is a human or animal tissue section

and/or endothelioid cells and/or protein chips and/or a cultivated piece of human or animal tissue.

4. The process as claimed in one of the preceding claims
5 wherein the cell-specific target structures are identified in a process comprising the following steps:

10 (I) automatically depositing a reagent solution Y_1 that includes at least one marker molecule on said cell-specific target structure;

15 (II) allowing the reagent solution Y_1 to react, and automatically detecting at least one marker pattern of the target structure labeled with the reagent solution Y_1 ;

20 (III) removing said reagent solution Y_1 before or after detecting the marker pattern, and repeating steps (I) and (II) with further reagent solutions Y_n ($n = 2, 3, \dots, N$) each containing said at least one marker molecule and/or at least another marker molecule; and

25 (IV) combining the marker patterns detected in step (II) to give a complex molecular combination pattern of the cell-specific target structure.

5. The process as claimed in one of the preceding claims wherein the selected target structures are biochemically characterized in procedural step e) by means of a molecule or molecular complex separation process, in particular a protein separation process.
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6. The process as claimed in claim 5 wherein said protein separation process is a 2D gel electrophoresis.

5 7. The process as claimed in one of the preceding claims wherein the following procedural step is performed after procedural step d):

10 d1) conducting inhibition experiments regarding one or plural ingredients of the cell-specific target structures selected in procedural step (d) for detecting a binding hierarchy of the ingredients.

15 8. The process as claimed in claim 7 wherein said ingredients are single or plural proteins of a cell-specific protein combination pattern.

20 9. The process as claimed in claim 1 wherein the following procedural steps are performed instead of procedural step e):

25 (f) automatically depositing a reagent solution Y1 that includes at least one marker molecule on said selected and enriched cell-specific target structure;

30 (g) allowing the reagent solution Y1 to react, and automatically detecting at least one marker pattern of the target structure labeled with the reagent solution Y1;

35 (h) removing said reagent solution Y1 before or after detecting the marker pattern, and repeating steps (f) and (g) with further reagent solutions Yn (n = 2, 3, ..., N) each containing said at least one marker

molecule and/or at least another marker molecule; and

(i) combining the marker patterns detected in step (g) to give a complex molecular combination pattern of the selected and enriched cell-specific target structure.